Scalable OF

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UK 5G Innovation Network

FRANC project in a nutshell

Scalable Optical Fronthaul for 5G OpenRAN

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(British Telecom, Compound Semiconductor Centre, Teropta, Aston University)

	With 5G fibre becomes a bottleneck unless wavelengths used are scaled
What	○ **Build multi-wavelength 5G fronthaul OpenRAN optical transponder** ○ Make it scalable, ie ‘sweat’ the fibre and use ‘all’ (including alien) wavelengths ○ Cut costs, reduce fibre rollout requirement and speed up deployment
Scalability operations	○ **Tower unbundling of operators** • Operators by tower are already separated on RF

Our impact on the market

- Tower unbundling
  - Operators upgrade one-by-one rather than as tower group
  - Enables fine-tuned operator tower strategies and rollouts

- Restore fibre capacity status quo; solve the 5G fibre wavelength constraint

- Flexible design architecture with upgrade capability (without deploying new fibre)
  - Light up extra optical wavelengths as data requirements to tower grow
  - Add new radio towers without having to install more fibre (‘daisy chain’)

- Hetnets (converged network)
  - Use the installed fibre and tower network for new enterprise use
  - Early monetisation; generate revenue from 85% unused wavelengths

How are we doing it?

Problem

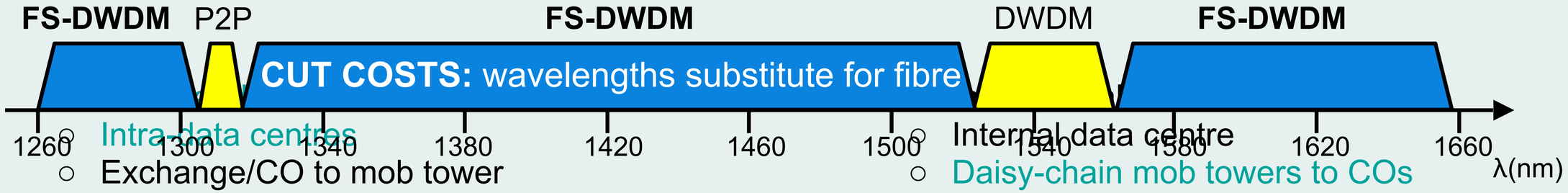
- Telecom lasers have suffered from low optical power (transmission reach/bandwidth trade off)
  - Changing temperature affects refractive index
  - Need to control wavelengths or deploy extra fibre (fibre deployment is expensive!)

Solution

- **Legacy**: P2P (3G, early 4G)
- Fibre is dedicated to a single wavelength (each up/down)
- More data needs more, new fibre

- **First Gen**: DWDM (4G)
- Control some wavelengths via lower power (ar devices
- Accommodates 4G data increase

Market

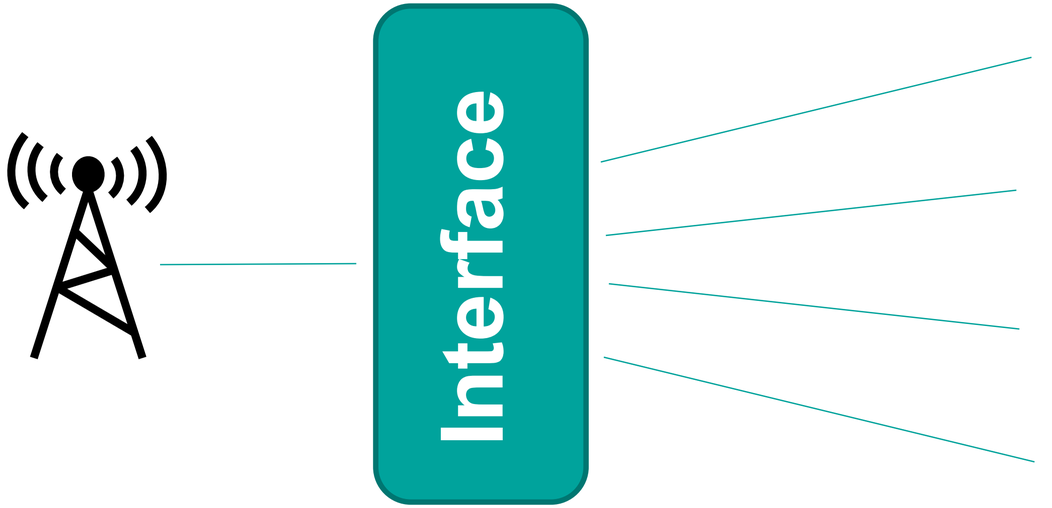


- Intra-data centres
- Exchange/CO to mob tower

- Internal data centre
- Daisy-chain mob towers to COs

Collaboration possibilities

Organize the interface between radio and 100s of separated wavelengths per tower



Wavelengths = Physical network slices

- Operators/competitors
- Mobile generations (NSA)
- Applications (user, IoT)
- Customer (enterprise, private network)

- Hardware/software
- Rules/standards
- Wavelength allocation
- Network routing